2009, Mathematics - Grade 8

Question 4: Multiple-Choice

Reporting Category: Patterns, Relations, and Algebra

Standard: 8.P.6

This item does not allow use of a calculator

At a book fair, Scott bought a $4 tote bag and some books for $2 each. The total amount Scott spent is represented by the equation below.

y = 2x + 4

What does the variable x represent in this equation?

A. the cost for one book

B. the total amount spent

C. the number of books bought

D. the cost of all the books bought

2009, Mathematics - Grade 8

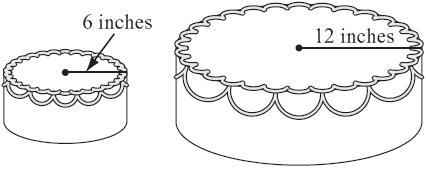
Question 13: Multiple-Choice

Reporting Category: Patterns, Relations, and Algebra

Standard: 8.P.8

This item allows use of a calculator

Callie makes wedding cakes with circular bases. She made a large cake with a radius of 12 inches and a small cake with a radius of 6 inches, as shown below.



Which of the following statements correctly compares the circumferences of the bases of the two cakes?

A. The circumference of the base of the large cake is 2 times that of the small cake.

B. The circumference of the base of the large cake is 4 times that of the small cake.

C. The circumference of the base of the large cake is 6 times that of the small cake.

D. The circumference of the base of the large cake is 8 times that of the small cake.

Mathematics - Grade 8

Question 1: Multiple-Choice

Reporting Category: Patterns, Relations, and Algebra

Standard: 8.P.6

This item does not allow use of a calculator

David joined a gym for one month. He paid a monthly fee of $20 plus $5 for each visit. The equation below can be used to find c, the total cost of joining the gym for one month and making v visits.

c = 20 + 5v

Based on the equation, which of the following statements is true?

A. As the total cost increases, the number of visits decreases.

B. As the total cost decreases, the number of visits stays the same.

C. As the number of visits increases, the total cost increases.

D. As the number of visits decreases, the total cost stays the same.

2008, Mathematics - Grade 8

Question 2: Multiple-Choice

Reporting Category: Patterns, Relations, and Algebra

Standard: 8.P.5

This item does not allow use of a calculator

What is the slope of the line represented by the table of values below?

|  |  |
| --- | --- |
| **x** | **y** |
| 0 | —20 |
| 1 | —10 |
| 2 | 0 |
| 3 | 10 |

A. 2

B. 3

C. 10

D. 20

2008, Mathematics - Grade 8

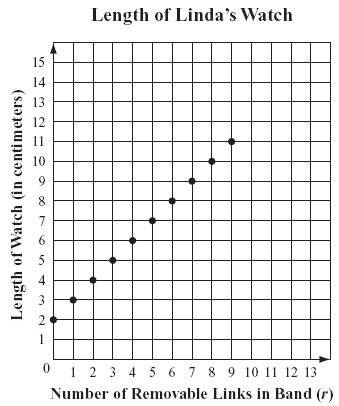
Question 4: Multiple-Choice

Reporting Category: Patterns, Relations, and Algebra

Standard: 8.P.1

This item does not allow use of a calculator

Linda has a watch with a band made of removable links. All the links are the same size. The length, in centimeters, of the watch with a band made of r removable links is shown in the graph below.



What is the length of Linda’s watch with 12 links?

A. 10 centimeters

B. 12 centimeters

C. 13 centimeters

D. 14 centimeters

2008, Mathematics - Grade 8

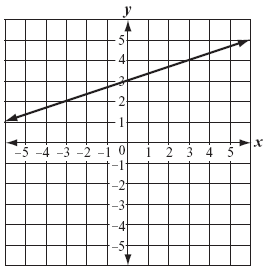
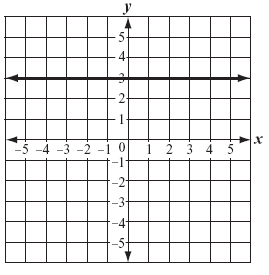
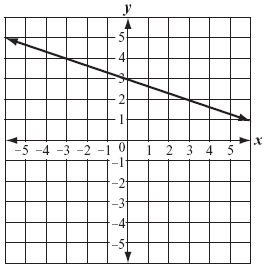
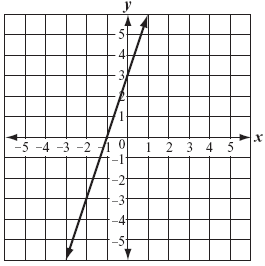
Question 13: Multiple-Choice

Reporting Category: Patterns, Relations, and Algebra

Standard: 8.P.10

This item does not allow use of a calculator

Which of the following lines appears to have the greatest slope?

A. Answer A

B. Answer B

C. Answer C

D. Answer D

2008, Mathematics - Grade 8

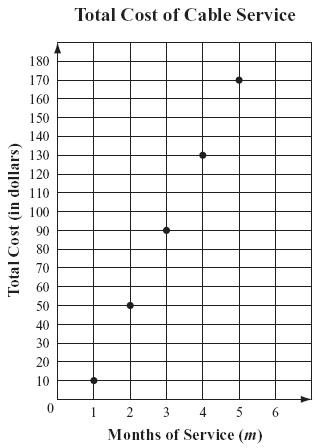
Question 14: Multiple-Choice

Reporting Category: Patterns, Relations, and Algebra

Standard: 8.P.4

This item does not allow use of a calculator

The graph below shows the total cost of cable service to new customers for the first five months.



Based on the data in the graph, which of the following expressions can be used to represent the total cost of cable service for m months?

A. 10m + 30

B. 10m + 40

C. 40m — 10

D. 40m — 30

2008, Mathematics - Grade 8

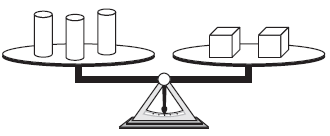
Question 17: Multiple-Choice

Reporting Category: Patterns, Relations, and Algebra

Standard: 8.P.7

This item does not allow use of a calculator

Yoshi has some identical wooden cylinders and some identical wooden cubes. He balanced 3 of the cylinders with 2 of the cubes, as shown below.



What is the number of cylinders needed to balance 16 cubes?

A. 11

B. 16

C. 17

D. 24

2008, Mathematics - Grade 8

Reporting Category: Patterns, Relations, and Algebra

This item allows use of a calculator

At the school carnival, Luke bought a hot dog for $2. He also bought g game tickets for $0.25 each. Luke spent a total of $10.

Which of the following equations can be used to find the number of game tickets that Luke bought?

A. 2g + 0.25 = 10

B. 2g — 0.25 = 10

C. 0.25g + 2 = 10

D. 0.25g — 2 = 10

2008, Mathematics - Grade 8

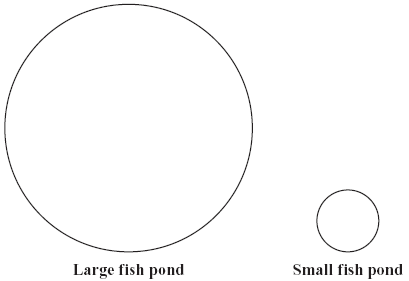
Question 27: Multiple-Choice

Reporting Category: Patterns, Relations, and Algebra

Standard: 8.P.8

This item allows use of a calculator

A park has a large fish pond and a small fish pond, as shown below.



\* Each pond is in the shape of a circle.

\* The radius of the large fish pond is 4 times the radius of the small fish pond.

Based on this information, which of the following statements is true?

A. The area of the large pond is 2 times the area of the small pond.

B. The area of the large pond is 4 times the area of the small pond.

C. The area of the large pond is 8 times the area of the small pond.

D. The area of the large pond is 16 times the area of the small pond.

2008, Mathematics - Grade 8

Question 32: Multiple-Choice

Reporting Category: Patterns, Relations, and Algebra

Standard: 8.P.3

This item allows use of a calculator

Which of the following is equivalent to the expression below?

—3(x + 1)

A. —3x — 3

B. —3x — 1

C. —3x + 1

D. —3x + 3

2008, Mathematics - Grade 8

Question 37: Multiple-Choice

Reporting Category: Patterns, Relations, and Algebra

Standard: 8.P.2

This item allows use of a calculator

Jake has a coin bank in the shape of a cylinder that has a radius of 1.5 inches and a height of 5 inches. He made a paper label to completely cover the curved surface of the cylinder.

The expression below can be used to find the area of the label, where r stands for the radius and h stands for the height.

2πrh

Which of the following is closest to the area of Jake’s label? (Use 3.14 for π.)

A. 15 square inches

B. 24 square inches

C. 35 square inches

D. 47 square inches

2007 Question 10: Multiple-Choice

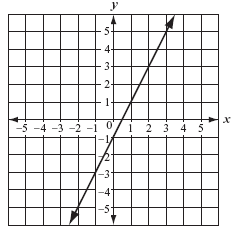
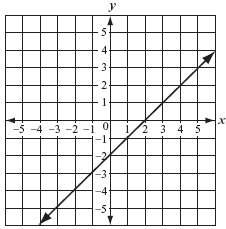
Reporting Category: Patterns, Relations, and Algebra

This item does not allow use of a calculator

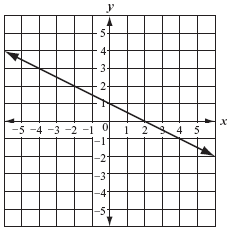
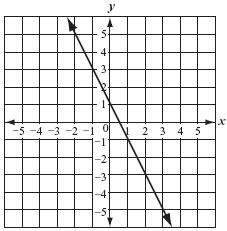
Which of the following graphs best represents the equation below?

y = –2x + 1

A. B.

C. D.

2007, Mathematics - Grade 8

Question 14: Multiple-Choice

Reporting Category: Patterns, Relations, and Algebra

Standard: 8.P.3

This item does not allow use of a calculator

Which of the following is equivalent to the expression below?

–2(x – 3)

A. x – 5

B. x + 6

C. –2x – 5

D. –2x + 6

2007, Mathematics - Grade 8

Question 16: Multiple-Choice

Reporting Category: Patterns, Relations, and Algebra

This item does not allow use of a calculator

The table below shows the relationship between the number of a term in a pattern and the value of that term. The same rule is used to find the value of the term in each row.

|  |  |
| --- | --- |
| Term Number | Value of Term |
| 1 | 3 |
| 2 | 5 |
| 3 | 7 |
| 4 | 9 |
| n | ? |

Based on the pattern shown in the table, which of the following expressions could represent the value of the nth term?

A. 3n

B. n + 2

C. n + 5

D. 2n + 1

2007, Mathematics - Grade 8

Question 23: Multiple-Choice

Reporting Category: Patterns, Relations, and Algebra

Standard: 8.P.2

This item allows use of a calculator

What is the value of the expression below when x = 3 and y = 5?

2 x 2 + 3y

A. 27

B. 33

C. 51

D. 53

2007, Mathematics - Grade 8

Question 27: Multiple-Choice

Reporting Category: Patterns, Relations, and Algebra

Standard: 8.P.5

This item allows use of a calculator

What is the slope of the line represented by the equation below?

y = 1/2x + 3

A. 1/3

B. 1/2

C. 2

D. 3

2007, Mathematics - Grade 8

Question 32: Multiple-Choice

Reporting Category: Patterns, Relations, and Algebra

Standard: 8.P.8

This item allows use of a calculator

Andrea went to an amusement park.

\* The cost of admission was $5.

\* The cost for each ride was $0.75.

The equation below shows c, Andrea’s total cost to go to the amusement park and go on r rides.

c = 5 + 0.75r

Based on the equation, which of the following statements is true?

A. As the value of r increases, the value of c increases.

B. As the value of r decreases, the value of c stays the same.

C. As the value of c decreases, the value of r increases.

D. As the value of c increases, the value of r stays the same.

2007, Mathematics - Grade 8

Question 37: Multiple-Choice

Reporting Category: Patterns, Relations, and Algebra

Standard: 8.P.4

This item allows use of a calculator

Amanda rents space at an outdoor market. Each month she pays the owner of the outdoor market $79 plus 10 percent of s, her total monthly sales.

Which of the following expressions represents the total amount of money that Amanda pays the owner for one month?

A. 79(0.1s)

B. 79s ÷ 0.1

C. 79s + 0.1

D. 79 + 0.1s

2006, Mathematics - Grade 8

Question 2: Multiple-Choice

Reporting Category: Patterns, Relations, and Algebra

Standard: 8.P.7

This item does not allow use of a calculator

A city planner created the table below to show the total number of seats for different numbers of subway cars.

|  |
| --- |
| Seats on Subway Car |
| Number of Subway Cars 6 8 10 12 |
| Total Number of Seats 180 240 300 360 |

Which of the following represents the relationship between x, the number of subway cars, and y, the total number of seats, for the data in the table?

A. y = 30x

B. x = 30y

C. y = 30 + x

D. x = 30 + y

2006, Mathematics - Grade 8

Question 6: Multiple-Choice

Reporting Category: Patterns, Relations, and Algebra

Standard: 8.P.1

This item does not allow use of a calculator

The table below shows four pairs of x and y values.

|  |  |
| --- | --- |
| x | y |
| 1 | 0 |
| 2 | 3 |
| 3 | 8 |
| 4 | 15 |

Which of the following equations is true for all pairs of x and y values in the table?

A. y = x + 1

B. y = x − 1

C. y = x2 + 1

D. y = x2 − 1

2006, Mathematics - Grade 8

Question 12: Multiple-Choice

Reporting Category: Patterns, Relations, and Algebra

Standard: 8.P.2

This item does not allow use of a calculator

The formula below can be used to determine f, the total braking distance, in feet, that a car moving at n miles per hour will travel after the driver applies the brakes.

f = n squared/20

Using this formula, what is the total braking distance that a car moving at 60 miles per hour will travel after the driver applies the brakes?

A. 6 feet

B. 60 feet

C. 180 feet

D. 1800 feet

2006, Mathematics - Grade 8

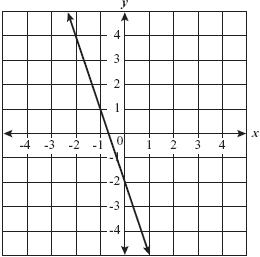
Question 17: Multiple-Choice

Reporting Category: Patterns, Relations, and Algebra

Standard: 8.P.7

This item does not allow use of a calculator

Which of the following equations best represents the line in the graph shown below?



A. y = −2x + 3

B. y = −3x + 2

C. y = −2x − 3

D. y = −3x − 2

2006, Mathematics - Grade 8

Question 26: Multiple-Choice

Reporting Category: Patterns, Relations, and Algebra

Standard: 8.P.9

This item allows use of a calculator

Denzel read about a glacier that is moving in the same direction at a rate of 80 meters every 3 years. At that rate, which of the following equations can be used to find d, the distance, in meters, that the glacier will move in t years?

A. d = 3/80 t

B. d = 80/3 t

C. d = t/3 + 80

D. d = t/3 − 80

2006, Mathematics - Grade 8

Question 32: Multiple-Choice

Reporting Category: Patterns, Relations, and Algebra

Standard: 8.P.4

This item allows use of a calculator

Which of the following is represented by the expression below?

5x + 2

A. two more than 1/5 of a number

B. two more than five times a number

C. five more than 1/2 of a number

D. five more than twice a number

2006, Mathematics - Grade 8

Question 34: Multiple-Choice

Reporting Category: Patterns, Relations, and Algebra

Standard: 8.P.7

This item allows use of a calculator

Four friends earned money by painting a house. After they divided the money equally, they each received $315.

Which of the following equations could be used to determine x, the total amount, in dollars, that the four friends earned by painting the house?

A. x/4 = 315

B. 4x = 315

C. x − 4 = 315

D. x + 4 = 315

2006, Mathematics - Grade 8

Question 35: Multiple-Choice

Reporting Category: Patterns, Relations, and Algebra

This item allows use of a calculator

At her job, Alexa is paid $12.00 per hour. When she drives her car for work, she is paid an additional 32.5¢ per mile. The expression below can be used to find the amount she is paid, in dollars, when she works for h hours and drives m miles in her car.

12h + 0.325m

How much is Alexa paid on a day when she works 3 1/2 hours and drives 218 miles in her car?

A. $74.50

B. $112.85

C. $230.00

D. $233.33

2006, Mathematics - Grade 8

Question 36: Multiple-Choice

Reporting Category: Patterns, Relations, and Algebra

Standard: 8.P.3

This item allows use of a calculator

Which of the following is equivalent to the expression below?

(−a)(b − c)

A. −ab − c

B. −ab + c

C. −ab − ac

D. −ab + ac

2004, Mathematics - Grade 8

Question 23: Multiple-Choice

Reporting Category: Patterns, Relations, and Algebra

Standard: 8.P.10

This item allows use of a calculator

Orlando and Carol each started an exercise program that included riding a bike. The table below shows the number of miles each traveled for 5 weeks of the program.

|  |  |  |
| --- | --- | --- |
| Weekly Miles Traveled Week | Orlando | Carol |
| 1 | 8 | 5 |
| 2 | 8.5 | 6 |
| 3 | 9 | 7 |
| 4 | 9.5 | 8 |
| 5 | 10 | 9 |
| 6 |  |  |
| 7 |  |  |
| 8 |  |  |

If both Orlando and Carol continue to increase the number of miles traveled each week at the constant rates shown in the table, which of the following is a true statement about week 8?

A. Carol will travel more miles than Orlando.

B. Orlando and Carol will travel the same number of miles.

C. Carol will travel a total of 13 miles.

D. Orlando and Carol will travel a total of 20 miles.

2004, Mathematics - Grade 8

Question 35: Multiple-Choice

Reporting Category: Patterns, Relations, and Algebra

Standard: 8.P.3

This item allows use of a calculator

Which of the following is equivalent to the expression below?

(4)(−x)(−y)

A. 4xy

B. −4xy

C. (−4)(x)(y)

D. (−4)(−x)(−y)

2004, Mathematics - Grade 8

Question 37: Multiple-Choice

Reporting Category: Patterns, Relations, and Algebra

Standard: 8.P.1

This item allows use of a calculator

An artist creates a design by drawing circles in steps, as shown below.

The table below shows a pattern of the total number of circles formed at each step.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Pattern of Circle Step | 1 | 2 | 3 | 4 | 5 |
| Total Number of Circles | 1 | 4 | 13 |  |  |

If the pattern shown in the table continues, what will be the total number of circles formed at step 5?

A. 52

B. 117

C. 121

D. 283

2003, Mathematics - Grade 8

Question 10: Multiple-Choice

Reporting Category: Patterns, Relations, and Algebra

Standard: 8.P.2

This item does not allow use of a calculator

If y + 5 is an even integer, which of the following could be the value of y?

A. −2

B. −1

C. 0

D. 2

2003, Mathematics - Grade 8

Question 27: Multiple-Choice

Reporting Category: Patterns, Relations, and Algebra

Standard: 8.P.1

This item allows use of a calculator

Juan’s parents put $10,000 into a college education savings account at the rate of 6% compounded annually. The chart below shows the value of the original investment at the end of years 1 and 2.

|  |  |  |  |
| --- | --- | --- | --- |
| Investment Value End of Year 1 | End of Year 2 | End of Year 3 | End of Year 4 |
| $10,600.00 | $11,236.00 |  | ? |

If no further deposits or withdrawals are made, what will the value of the original investment be at the end of year 4? Round your answer to the nearest dollar.

A. $11,836.00

B. $12,436.00

C. $12,584.00

D. $12,625.00

2003, Mathematics - Grade 8

Question 36: Multiple-Choice

Reporting Category: Patterns, Relations, and Algebra

Standard: 8.P.1

This item allows use of a calculator

The input-output table below shows values for x and y.

|  |  |
| --- | --- |
| INPUT (x) | OUTPUT (y) |
| −2 | 6 |
| 2 | 2 |
| 3 | 6 |
| 4 | 12 |

Which equation could represent a rule for the relationship between x and y?

A. y = x2 − x

B. y = x2 + 2

C. y = 2x − 2

D. y = −2x + x

2003, Mathematics - Grade 8

Question 37: Multiple-Choice

Reporting Category: Patterns, Relations, and Algebra

Standard: 8.P.9

This item allows use of a calculator

Guenther drove 260 miles in 5 hours. He has 494 more miles to drive on his trip. If he continues at this same average rate of speed, what will his driving time be for the remainder of his trip?

A. 7.6 hours

B. 9.5 hours

C. 13 hours

D. 14.5 hours